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FUNCTIONAL ANALYSIS AND TREATMENT OF HAIR TWIRLING IN A YOUNG CHILD

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A young child participated in a functional analysis and treatment of hair twirling, a frequently occurring precursor to hair pulling. The functional analysis showed that hair twirling occurred mostly when the child was alone at bedtime. Noncontingent application of mittens decreased hair twirling to near-zero levels in two settings (home and day care).

DESCRIPTORS: automatic reinforcement, functional analysis, hair pulling, hair twirling, sensory extinction

Successful treatments for hair pulling in children typically involve parent-, therapist-, or teacher-implemented consequences (Elliott & Fuqua, 2000). Although these treatments often are effective, the function of hair pulling has been investigated in just two studies (Miltenberger, Long, Rapp, Lumley, & Elliott, 1998; Rapp, Miltenberger, Galensky, Ellingson, & Long, 1999). Because these findings indicate that hair pulling is often maintained independent of social consequences and, in many cases, occurs primarily when the individual is alone, treatments that do not require continuous monitoring of the behavior may be most appropriate for these cases.

Research on behavior problems maintained by automatic reinforcement suggests two potential interventions that do not require the presence of a caregiver: (a) providing access to alternative forms of stimulation (e.g., toys) that compete with the reinforcement produced by the behavior, and (b) using protective equipment to block or attenuate the consequences of the behavior (Rapp et al., 1999). The latter intervention seems to be more appropriate if treatment occurs in the context of bedtime. For example, Blum, Barone, and Friman (1993) had a 3-year-old girl wear socks on her hands at bedtime to treat hair pulling. The purpose of the present study was to evaluate functional analysis and treatment procedures for a child whose hair twirling appeared to be maintained independent of social consequences and occurred primarily when the child was alone (during naps and at bedtime). Hair twirling was chosen for analysis and treatment because it was a frequently occurring precursor to damaging hair pulling for this child.

METHOD

Subject and Setting

Tina, age 2 years 5 months, had been referred for treatment of hair twirling and pulling. Hair twirling involved movement of her fingers in her hair until hair was wrapped around her fingers. The behavior often was forceful enough to pull out hair and had produced several areas of short, thin

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hair. Tina had on occasion wrapped her hair so tightly around her finger that the finger turned blue and the hair had to be cut from around her finger. Assessment and treatment took place in Tina's home at bedtime and at day care during naps.

Response Measurement and Interobserver Agreement

Because hair twirling was a high-frequency behavior that always occurred prior to hair pulling, hair twirling was identified as the target behavior. Hair twirling was defined as movement of Tina's fingers in her hair. Data were collected in 5-min segments for the functional analysis and 10-min segments for baseline and treatment by videotaping in Tina's bedroom at bedtime and in her day care during naps. Tina was always awake during observation sessions. Each videotape was scored for the occurrence or nonoccurence of the target behavior on a second-by-second basis to obtain the exact onset and offset of the behavior. The number of seconds of occurrence was divided by the session duration to generate a percentage of session time. Interobserver agreement was assessed by having a second observer score 25% of the sessions and comparing the two observers' rating sheets for the occurrence and nonoccurence of the target behavior on a second-by-second basis. The number of agreements on occurrence and nonoccurence of the behavior was divided by the total number of seconds in the session and then multiplied by 100% to obtain the percentage of agreement between the two observers. Mean interobserver agreement was 96.1% (range, 80% to 100%).

Functional Analysis

Tina was exposed to three functional analysis conditions within a multielement design over 3 days. Information obtained from interviewing Tina's mother and from direct observation indicated that the behavior occurred primarily when Tina was alone (i.e., at bedtime) and that the only social consequence associated with the behavior was parent attention in the form of verbal reprimand. Therefore, contingent and noncontingent attention conditions were implemented in conjunction with an alone condition. All sessions were conducted at bedtime in Tina's bedroom after Tina had been told to lie down in bed. The alone condition consisted of videotaping Tina while she was alone in her bed. In the contingent attention condition, Tina's mother sat next to the bed and pretended to read. When Tina started to twirl her hair, Tina's mother provided social disapproval (e.g., "Momma doesn't like it when you do that"). In the noncontingent attention condition, her mother sat next to her and delivered continuous attention by talking to Tina or rubbing her back.

Treatment Evaluation

Because hair twirling occurred when Tina was alone, a treatment (noncontingent application of mittens) that did not require parent-implemented consequences was evaluated. Baseline and treatment conditions were implemented in a multiple baseline across settings design with an ABAB design in each setting. Baseline consisted of videotaping Tina while she was alone in her bedroom at bedtime and while she was lying down for a nap at day care. During treatment, Tina wore thin cotton mittens on both hands while she was alone in her bedroom at bedtime and while she was lying down for a nap at day care. The mittens were placed on her hands prior to telling her to lie down. Tina never attempted to remove the mittens.

RESULTS AND DISCUSSION

During the functional analysis (Figure 1), the highest level of hair twirling occurred in

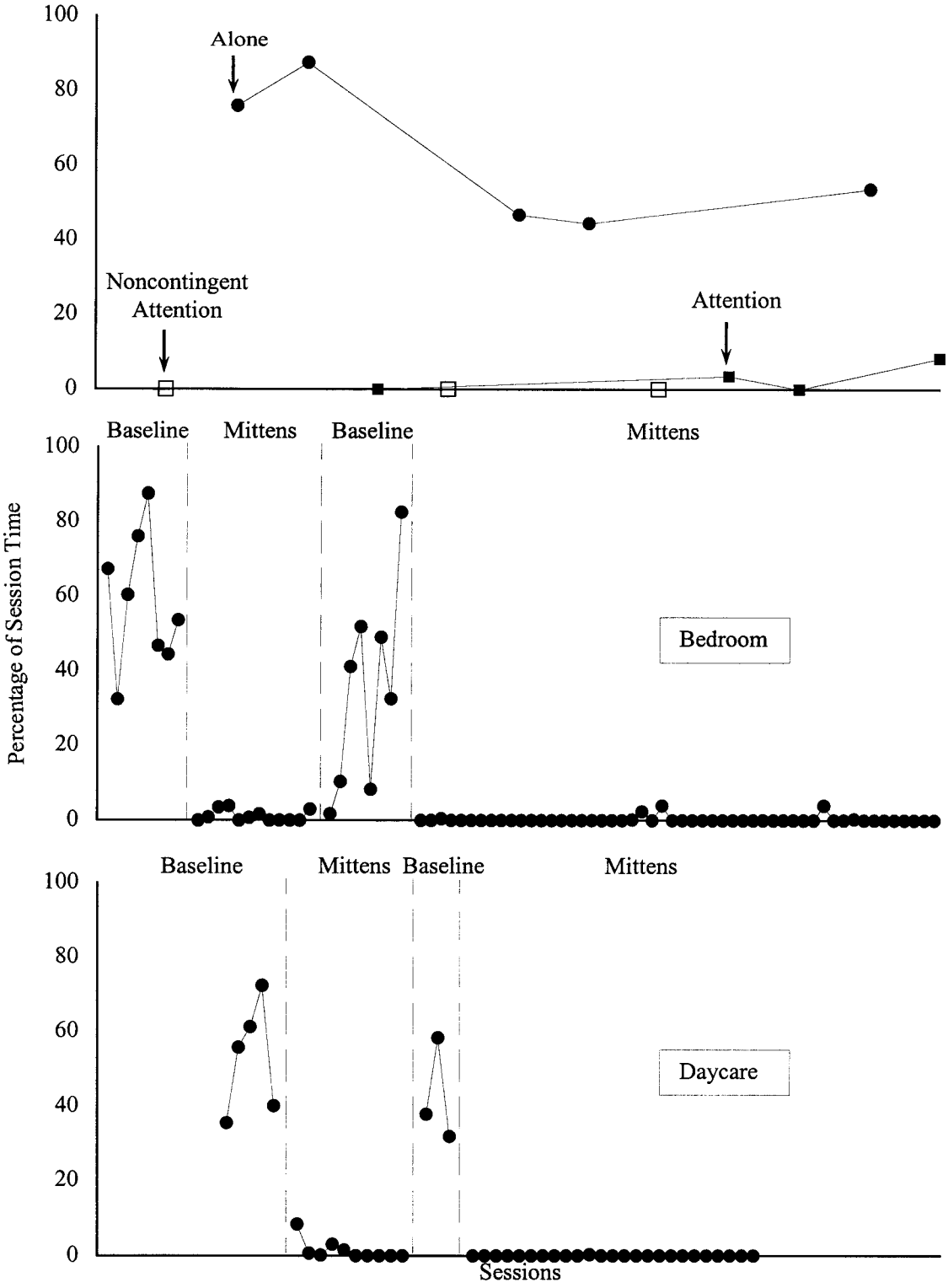

Figure 1. The top panel shows the percentage of session time of hair twirling during the functional analysis. The middle and bottom panels show the percentage of session time of hair twirling during baseline and treatment conditions in the home and day care settings.

the alone condition (M = 61.6%). Little or no hair twirling occurred during the noncontingent attention (M = 0%) and contingent attention (M = 2.95%) conditions. These findings suggested that Tina was not engaging in hair twirling to obtain attention and that the behavior persisted in the absence of social consequences. We speculated that hair twirling was maintained by some form of automatic reinforcement.

The use of mittens decreased hair twirling to near-zero levels each time it was implemented in both settings (Figure 1). Observations conducted two to four times per week for 2 months and twice per month for another 8 months indicated that treatment effects were maintained for 10 months in the home and day care settings.

This study illustrates a case in which hair twirling, a high-frequency precursor to hair pulling, was effectively treated with mittens, an intervention that the parents and day care provider considered acceptable and easy to use. Nonetheless, the mechanism responsible for the effects was not clear. The mittens could have attenuated or eliminated the maintaining reinforcer for hair twirling through sensory extinction, physically prevented the behavior, or increased the effort to engage in the behavior. Another limitation of this investigation was the absence of outcome data to document that the elimination of hair twirling resulted in hair regrowth in the affected areas.

Further research is warranted to evaluate interventions that can be used when a child engages in habit behaviors while alone. Future research should also investigate strategies for fading such interventions and for evaluating the specific nature of the automatic reinforcement maintaining habit behaviors.

REFERENCES

Blum, N. J., Barone, V. J., & Friman, P. C. (1993). A simplified behavioral treatment for trichotillomania: Report of two cases. *Pediatrics, 93,* 993–995.

Elliott, A. J., & Fuqua, R. W. (2000). Trichotillomania: Conceptualization, measurement, and treatment. *Behavior Therapy, 31,* 529–545.

Miltenberger, R. G., Long, E. S., Rapp, J. T., Lumley, V., & Elliott, A. (1998). Evaluating the function of hair pulling: A preliminary investigation. *Behavior Therapy, 29,* 211–219.

Rapp, J. T., Miltenberger, R. G., Galensky, T. L., Ellingson, S. A., & Long, E. S. (1999). A functional analysis of hair pulling. *Journal of Applied Behavior Analysis, 32,* 329–337.

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